

## Substitute Specification- Marked Up

## IMPROVED ORAL MUCOUS MEMBRANE PROTECTOR FOR ORTHODONTIC

## APPLICATIONS

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## DESCRIPTION

## Background of the Invention

The present invention, improved oral mucous membrane protector for orthodontic ~~applications~~ appliances, relates to a new and original mucous membrane and lip protection device in certain orthodontic technique applications.

Therefore, the present invention is especially interesting for the field of the orthodontic branch of the odontological industry, and especially of orthodontic techniques.

Orthodontic treatments are currently widely known, which treatments are carried out by removable or fixed ~~apparatuses~~ appliances or ~~apparatuses~~ appliances cemented or attached to teeth as in the case of brackets, which can be metallic, ceramic or plastic. Braces and arch wires are common ~~applications~~ appliances in orthodontics; they ~~shall be~~ are prescribed and designed by a professional according to the problem to be treated.

Treatments of this type are carried out applying a slight constant force in a controlled direction, and the ~~apparatuses~~ appliances will move teeth slowly, through the bone sustaining them, towards the new desired position.

In some cases, orthodontic ~~apparatuses~~ appliances, especially removable ones, direct forces for guiding jaw growth and development in children and teenagers (prevention treatment). For example, a "jaw expansion" apparatus can widen the upper jaw if it is narrow in only a couple of months.

Although in practice it is observed that there are no protective material element for the ends of metallic orthodontic ~~applications~~ appliances and more specifically for the sharp distal end of the orthodontic ~~arch~~ archwire, there

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are background documents relating to orthodontic assemblies such as those contained in WO 2004069082 for "VERTICAL BUCAL TUBES WITH MALLEABLE ARRESTING FLAPS", in the name of De Simone Pasquale (IT); EP 1360941 A1 for "ZAHNSPANGE" (DENTAL BRACES), in the name of Weissbach Otte K. and WO 021091940 A1, for "SUTURE EXPANSION DEVICE", in the name of Van Straten Research & Development B.V., and more specifically to the recent U. 200500029 for "ORAL MUCOUS MEMBRANE PROTECTOR FOR ORTHODONTIC APPLICATIONS" of the same inventor and the same applicant of this specification corresponding to a simple version which does not deal with or specify the structural expression, the correct constructive version and the material factor which are developed in the object of this patent.

Nevertheless and despite the benefits, these treatments imply a series of discomforts for the patient. For example, patients who have brackets and wires must take care to not eat hard foods or bite objects because this makes the apparatuses appliances fall or become deformed, delaying the treatment.

Likewise the tendency to accumulate bacterial plaque is greater in teeth with apparatuses appliances because these retain more food remains, therefore hygiene must be meticulous otherwise the gums will inflame and cavity formation will be imminent and then the treatment will have to be stopped in order to solve these problems, and this would increase the time and costs.

Lips, cheeks and tongue can also be irritated for one or two weeks while they get used to the apparatuses appliances and therefore they become inflamed; this situation ends quickly without any major consequences.

To this respect, there are two main techniques to prevent the distal parts of orthodontic arches archwires from pricking the jugal mucous membrane (cheek mucous membrane).

On one hand, orthodontic wax can be used. This is supplied in easily applicable wax bars, by means of molding it and placing it covering the end of the arch projecting from

the tube, as well as any other metallic element of the brace system, for the purpose of preventing contact with the mucous membranes and the damage thereof.

5 The other system consists of the use of distal cutting pliers. These are special pliers for cutting that part projecting from the arch at the level of the distal end of the molar tube. Nevertheless, there are three circumstances in which this is not effective. The first is when the arches are thin (of a small profile) and they move towards one of the 10 sides, making them prick the mucous membrane of one side and ~~coming out of~~ disengaging from the molar tube on the opposite side. The second situation is when dental retrusion movements ~~are carried out~~ occur, in which the length of the dental 15 ~~arcade arch~~ decreases, leaving extra ~~arch~~ archwire on both sides of the ~~arcade arch~~ and pricking the mucous membrane bilaterally. The third situation is when the molar is rotated, the distal part of the molar tube is directly facing the cheek mucous membrane and although the ~~arch~~ archwire is cut at the level of the tube, it pricks the mucous membrane.

20 **Summary of the Invention**

25 The present invention satisfactorily solves the previous drawbacks and therefore, it implies an important progress in the state of the art, providing a simple and comfortable solution of wide use in patients suffering from this type of treatments.

30 In view of the above, the present improved oral mucous membrane protector for orthodontic applications described below is mainly and essentially formed by a structure of a protective element or member, susceptible of being fixed to a bracket system surrounding the molar tube, behind its flaps, at the height of the arch projecting from the tube at the distal end and covering, enveloping and protecting the distal end of the arch. The mentioned protective element or member is 35 fixed to the cited brace system in the molar tube behind the flaps, which acts functionally as a receiver of the end of the

arch and guide thereof.

On the other hand, the mentioned protective element or member is formed by two functional parts, one part for fixing on the molar tube behind the flaps of the bracket structure where the end of the arch is, and a cover or cap for covering the mentioned distal end of the ~~arch~~ archwire and for protecting the mucous membranes inside the mouth. Said fixing of the cover or cap is formed by an elastic ring integral therewith.

10 Likewise, the ring part for fixing to the molar tube of the bracket system embraces the molar tube behind the flaps which exists for the guiding of said fixing ~~arch~~ archwire the end of which is covered with the mentioned cover or cap for protecting the mucous membranes inside the mouth.

15 On the other hand, the mentioned cover or cap for covering the mentioned end of the ~~arch~~ archwire and for protecting the mucous membranes inside the mouth is preferably made of synthetic, elastic, impermeable and soft material, for example a silicone or solid gel, so it can be adapted to the 20 length of the distal end of the ~~arch~~ archwire to be covered. Furthermore, said cover or cap for covering the mentioned end of the ~~arch~~ archwire and for protecting the mucous membranes can also be reinforced in its interior, in the bottom part, by a reinforcement formed by thickening the material itself or 25 another suitable material, thus increasing its resistance to being torn or perforated by the sharp distal end of the ~~arch~~ archwire.

#### **Brief Description of the Drawings**

30 A detailed description of the oral mucous membrane protector which is the object of the present invention will be carried out below with reference to the attached drawings which show, by way of a non-limiting example, a preferred embodiment susceptible of all those detail variations which do not imply a fundamental alteration of the essential features 35 of said improvements.

Said drawings illustrate:

Figure 1 shows a side elevational view of an orthodontic assembly for the oral mucous membrane protector for orthodontic applications object of the invention and an enlarged detail of the application.

Figure 2 shows an upper plan view of the representation of the previous figure at Figure 90° therefrom.

Figure 3 shows a sectional view of the enlarged detail of Figure 1.

Figure 4 shows a horizontal perspective view of the cover or cap according to the invention.

Figure 5 shows a perspective view of the protective cover or cap assembled on the molar tube in a normal application projection.

Figure 6 shows a sectioned view of Figure 4 in a vertical position of the cover or cap reinforced at the bottom thereof.

#### Description of the Preferred Embodiments

According to the depicted embodiment, the oral mucous membrane protector for orthodontic applications shown in this preferred embodiment is essentially formed by a structure (1) of synthetic, elastic, impermeable and soft material, for example a silicone or solid gel, a protective element or member susceptible of being fixed to a bracket system (4) surrounding the molar tube (3) behind its flaps, at the height of the arch archwire (5) projecting from the distal end (8) of the molar tube (3) that is joined to the strip band (7) of the molar (6), covering and enveloping the end (8) of the arch archwire (5). The mentioned protective element or member (1) is fixed to the mentioned bracket system (4) by means of a ring (2), and more specifically in the molar tube (3), functionally acting as a guide of the distal end (8) of the arch archwire (5), potentially isolating it from the mucous membranes susceptible of being damaged inside the patient's mouth.

5 On the other hand the mentioned protective element or member (1) is formed by two functional parts, one part (2) for fixing on the molar tube (3) of the bracket system (4), where the end (8) of the ~~arch~~ archwire (5) is and for protecting the mucous membranes inside the mouth, said fixing (2) of the cover or cap (1) being formed by a ring of elastic material or rubber joined thereto.

10 On the other hand, the mentioned cap or cover (1) for covering the mentioned distal end (8) of the ~~arch~~ archwire (5) and protecting the mucous membranes inside the mouth, of the mentioned elastic material, can be adapted to the length of the end (8) of the ~~arch~~ archwire (5) to be covered and protected. Said cap or cover (1) for covering the mentioned end (8) of the ~~arch~~ archwire (5) and for protecting the mucous membranes can further be reinforced (9) in its interior, at the bottom part, with an optional reinforcement, even of the same material, thus increasing its resistance to being torn or perforated by the sharp end (8) of the ~~arch~~ archwire (5).

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20 Finally, the shape, materials and sizes may vary and generally so may any accessory and secondary aspect provided that it does not change or modify the essential feature of the improvements that have been described.